OIL-X EVOLUTION

The most energy efficient compressed air filters in the world

Parker

domnick hunter

www.domnickhunter.com

COMPRESSED AIR - THE 4TH UTILITY

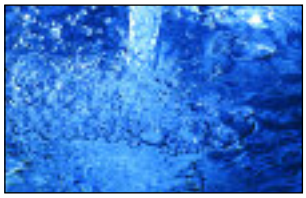
COMPRESSED AIR IS A SAFE AND RELIABLE POWER SOURCE THAT IS WIDELY USED THROUGHOUT INDUSTRY. APPROXIMATELY 90% OF ALL COMPANIES USE COMPRESSED AIR IN SOME ASPECT OF THEIR OPERATIONS, HOWEVER UNLIKE GAS, WATER AND ELECTRICITY, COMPRESSED AIR IS GENERATED ON-SITE, GIVING THE USER RESPONSIBILITY FOR AIR QUALITY AND OPERATIONAL COSTS.

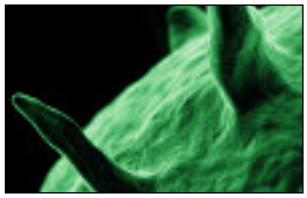
COMPRESSED AIR IS NOT WITHOUT IT'S PROBLEMS, WITH ALL SYSTEMS SUFFERING FROM PERFORMANCE AND RELIABILITY ISSUES. ALMOST ALL OF THESE CAN BE DIRECTLY ATTRIBUTED TO CONTAMINATION, THE MAIN SOURCES OF WHICH ARE :

- **THE AMBIENT AIR BEING DRAWN INTO THE COMPRESSOR**
- **THE TYPE AND OPERATION OF THE AIR COMPRESSOR**
- **COMPRESSED AIR STORAGE VESSELS**
- **DISTRIBUTION PIPEWORK**

There are 10 major contaminants found in a compressed air system, these are:

- **Water Vapour**
- **Condensed Water**
- **Water Aerosols**
- **Atmospheric Dirt**
- **Rust**
- **Pipescale**
- **Liquid Oil**
- **Oil Aerosols**
- **Oil Vapour**
- **Micro-organisms**





The largest quantity of contamination introduced into the compressed air system originates from the atmospheric air drawn into the compressor and not as often believed, introduced by the compressor itself. The most prolific and problematic of the contaminants is water which accounts for 99.9% of the total liquid contamination found in a compressed air system.

High efficiency compressed air filtration is not only used to remove particulate and oil, but more importantly it removes water aerosols and is key to operating an efficient and cost effective compressed air system.

Regardless of what type of compressor is installed, the same level of filtration is required.

Contaminant removal

Failure to remove this contamination can cause numerous problems in the compressed air system, such as:

- **Corrosion within storage vessels and the distribution system**
- **Blocked or frozen valves, cylinders, air motors and tools**
- **Damaged production equipment**
- **Premature unplanned desiccant changes for adsorption dryers**

In addition to problems associated with the compressed air system itself, allowing contamination such as water, particulate, oil and micro-organisms to exhaust from valves, cylinders, air motors and tools, can lead to an unhealthy working environment with the potential for personal injury, staff absences and financial compensation claims.

Compressed air contamination will ultimately lead to:

- **Inefficient production processes**
- **Spoiled, damaged or reworked products**
- **Reduced production efficiency**
- **Increase manufacturing costs**

The table below highlights each of the purification technologies required to remove the different contaminants present in the compressed air system.

CONTAMINANTS								
Purification Equipment Technologies	Bulk Condensed Water	Water Vapour	Water Aerosols	Atmospheric Dirt & Solid Particulate	Micro-organisms	Oil Vapour	Liquid Oil & Oil Aerosols	Rust & Pipescale
Water Separator	✓	✗	✗	✗	✗	✗	✗	✗
Coalescing Filter	✗	✗	✓	✓	✓	✗	✓	✓
Adsorption Filter	✗	✗	✗	✗	✗	✓	✗	✗
Adsorption Dryer	✗	✓	✗	✗	✗	✗	✗	✗
Refrigeration Dryer	✗	✓	✗	✗	✗	✗	✗	✗
Dust Removal Filter	✗	✗	✗	✓	✓	✗	✗	✓
Microbiological Filter	✗	✗	✗	✓	✓	✗	✗	✗

ARE ALL COMPRESSED AIR FILTERS THE SAME?

COMPRESSED AIR PURIFICATION EQUIPMENT IS ESSENTIAL TO ALL MODERN PRODUCTION FACILITIES. IT MUST DELIVER UNCOMPROMISING PERFORMANCE AND RELIABILITY WHILST PROVIDING THE RIGHT BALANCE OF AIR QUALITY WITH THE LOWEST COST OF OPERATION. TODAY, MANY MANUFACTURERS OFFER PRODUCTS FOR THE FILTRATION AND PURIFICATION OF CONTAMINATED COMPRESSED AIR, WHICH ARE OFTEN SELECTED ONLY UPON THEIR INITIAL PURCHASE COST, WITH LITTLE OR NO REGARD FOR THE AIR QUALITY THEY PROVIDE OR THE COST OF OPERATION THROUGHOUT THEIR LIFE. WHEN PURCHASING PURIFICATION EQUIPMENT, THE DELIVERED AIR QUALITY, COST OF OPERATION AND THE OVERALL COST OF OWNERSHIP MUST ALWAYS BE CONSIDERED.

DESIGNED FOR AIR QUALITY & ENERGY EFFICIENCY

THE DOMNICK HUNTER DESIGN PHILOSOPHY

ALL DOMNICK HUNTER FILTRATION AND PURIFICATION PRODUCTS ARE DESIGNED WITH THE PHILOSOPHY OF AIR QUALITY, ENERGY EFFICIENCY AND LOW LIFETIME COSTS.

Air quality

Compressed air purification equipment is installed to deliver high quality, clean dry air, and to eliminate the problems and costs associated with contamination. When selecting this type of equipment, the delivered air quality and the verification of performance must always be the primary driver, otherwise why install it in the first place.

- **OIL-X EVOLUTION filters provide air quality in accordance with ISO 8573.1:2001, the international standard for compressed air quality**
- **OIL-X EVOLUTION coalescing filters are the first range of filters specifically designed to deliver air quality in accordance with ISO 8573.1 : 2001 when tested with the stringent requirements of the new ISO 12500-1 international standard for Compressed Air Filter Testing**
- **OIL-X EVOLUTION dust removal filters and adsorption filters are also tested in accordance with the test methods of the ISO 8573 series**
- **OIL-X EVOLUTION filter performance has been independently verified by Lloyds Register**
- **OIL-X EVOLUTION coalescing and dust removal filters are covered by a one year compressed air quality guarantee**
- **The air quality guarantee is automatically renewed with annual maintenance**

Energy efficiency

After air quality, the next consideration when selecting a compressed air filter is the cost of operation. OIL-X EVOLUTION filters not only provide air quality in accordance with the international standards, they are designed to do so with the lowest operational costs available.

- **OIL-X EVOLUTION filters use aerospace technology to keep pressure losses to a minimum**
- **Deep pleat element technology and specially treated filtration media provides a low pressure loss filter element with 450% more filtration surface area when compared to a conventional wrapped filter, and 200% greater area than typical pleated filter elements**
- **Overall pressure losses start low and stay low throughout the 12 month life of the filter element**
- **Can help to significantly reduce your carbon footprint**

Alternative Manufacturer Initial Saturated Differential Pressure (mbar)	Annual Savings with OIL-X EVOLUTION	
	EVOLUTION Energy Saving Kw	EVOLUTION Environmental Saving Kg/CO_2
200	4,973	2,139
250	6,259	2,691
300	9,619	4,136
350	12,979	5,581
400	16,339	7,026
450	19,699	8,470
500	23,059	9,915

Example based upon :
System Pressure : 7 bar g
Compressor Size : 120 Kw
Duration of Operation : 8000 Hrs
OIL-X EVOLUTION Grade AA Coalescing Filter 0.01 micron (0.01mg/m^3)
Alternative Manufacturer's Coalescing Filter 0.01 micron (0.01mg/m^3)

Low lifetime costs

Equipment with a low purchase price may turn out to be a more costly investment in the long term. By guaranteeing air quality and ensuring energy consumption is kept to a minimum, domnick hunter OIL-X EVOLUTION filters can reduce the total cost of ownership and help improve your bottom line through improved manufacturing efficiencies.

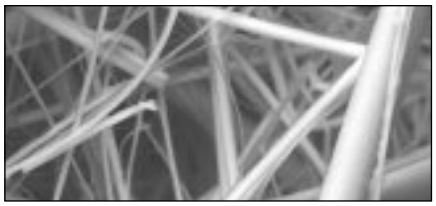
AIR QUALITY

THE DOMNICK HUNTER OIL-X EVOLUTION RANGE OF COMPRESSED AIR FILTERS HAS BEEN DESIGNED FROM THE OUTSET TO MEET THE REQUIREMENTS OF ISO 8573.1 : 2001, THE INTERNATIONAL STANDARD FOR COMPRESSED AIR QUALITY, WHEN VALIDATED IN ACCORDANCE WITH THE REQUIREMENTS OF ISO 12500, THE INTERNATIONAL STANDARD FOR FILTER TESTING AND THE TEST METHODS OF ISO 8573.2, ISO 8573.4 AND ISO 8573.5.

DESIGNED FOR AIR QUALITY & ENERGY EFFICIENCY

Correct selection of filtration media

Coalescing and dust removal filters use a high efficiency borosilicate glass nanofibre material which has a 96% voids volume, providing media with excellent filtration efficiency and a high dirt holding capacity.

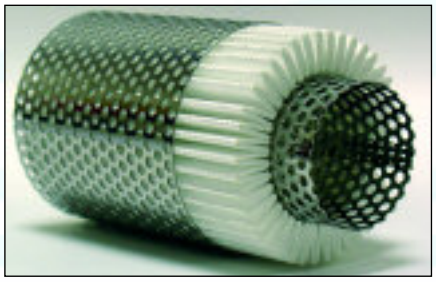


Construction of the filtration media into a filter element

OIL-X EVOLUTION filter elements use pleated not wrapped filter media, which is constructed using a unique deep bed pleating technique. This provides 450% more filtration surface area when compared to a traditional wrapped filter element and around 200% more surface area compared to a traditional pleated element.

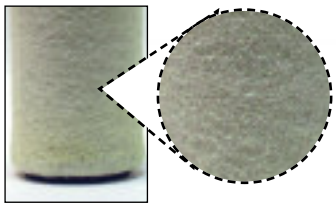
Deep bed pleating also reduces the air flow velocity within the media, which further improves filtration performance.

Additionally, the high efficiency AA and AAR grade elements have a unique graded density media construction which provides even greater filtration performance without adding to pressure loss or energy consumption.



OIL-X EVOLUTION coalescing filters utilise four drainage methods to ensure high performance, whilst conventional filters only use one.

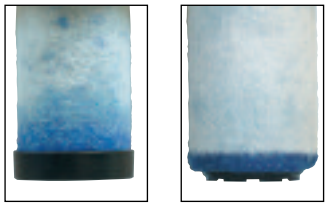
Drainage method 1



High efficiency drainage layer provides increased liquid drainage, improved chemical compatibility and higher operational temperatures when compared to conventional materials.

Drainage method 2

Typical element *OIL-X EVOLUTION*



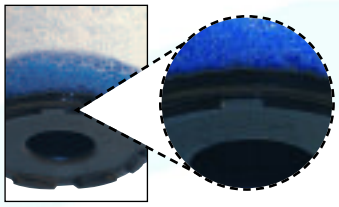
Wet band in air flow path

No wet band in air flow path

Traditional elements have a build up of liquid known as a "wet band" where the drainage layer is glued into the lower endcap.

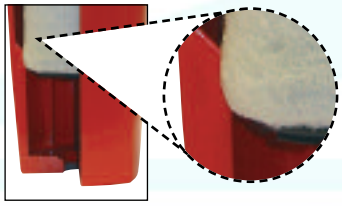
The OIL-X EVOLUTION design wraps the drainage layer under lower endcap removing coalesced liquid from the air flow path, increasing liquid removal efficiency, and providing more usable filtration surface area.

Drainage method 3



Surface tension breakers are moulded into the lower filter element endcap to prevent liquid from sticking, and to ensure fast and efficient drainage of coalesced liquid.

Drainage method 4



Drainage ribs cast into the filter bowl compress the lower part of the filter element, allowing bulk liquid to rapidly drain from the filter element through capillary action.

AIR QUALITY - GUARANTEED

Filtration performance of OIL-X EVOLUTION filters are not only tried and tested by domnick hunter, but has also been independently validated by Lloyds Register.

Lloyd's Register	Independent Performance Validation in Accordance with:			
	ISO 12500.1 OIL AEROSOL	ISO 8573.2 OIL AEROSOL	ISO 8573.4 SOLID PARTICULATE	ISO 8573.5 OIL VAPOUR
Coalescing filters	✓	✓	✓	X
Dry Particulate filters	X	X	✓	X
Oil Vapour Removal filters	X	X	X	✓

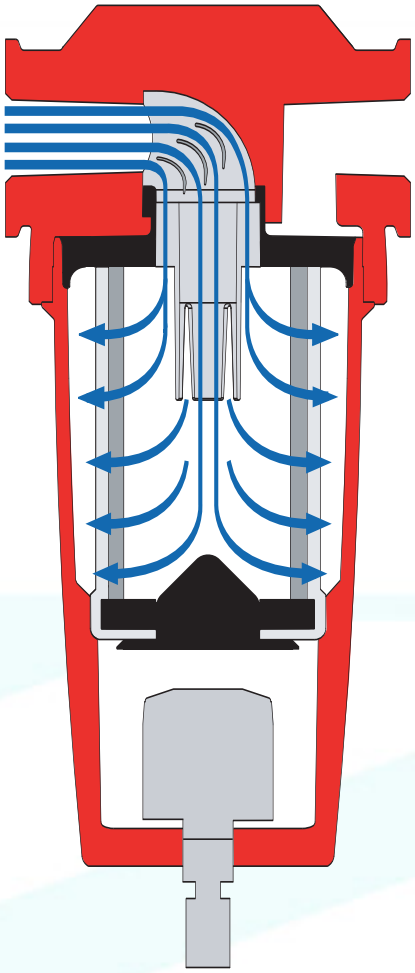
ENERGY EFFICIENCY

ANY RESTRICTION TO AIRFLOW WITHIN A FILTER HOUSING / ELEMENT WILL REDUCE THE SYSTEM PRESSURE. TO GENERATE COMPRESSED AIR, LARGE AMOUNTS OF ELECTRICAL ENERGY IS REQUIRED, THEREFORE ANY PRESSURE LOST WITHIN THE SYSTEM CAN BE DIRECTLY CONVERTED INTO A COST FOR WASTED ENERGY. THE HIGHER THE PRESSURE LOSS, THE HIGHER THE ENERGY COSTS.

Pressure loss in a compressed air filter is a combination of fixed pressure losses and incremental pressure losses. Fixed pressure losses come from the filter housing and the interface between the filter housing and filter element. Incremental pressure losses come from the filter element as it blocks up with contamination during operation.

In most filters, high operational costs are generally due to a poorly designed airflow path within the filter housing and element and poorly selected filtration media. In addition to this, the high differential pressure change points recommended by many filter manufacturers increase operational costs even further.

Providing an optimal flow path for the compressed air is key to reducing system operating costs.



AEROSPACE FLOW MANAGEMENT SYSTEM

"Bell mouth" housing inlet & full flow inlet conduit

OIL-X EVOLUTION filter housings feature a "Bell Mouth" inlet to provide a smooth, turbulent free transition for the air as it enters into the filter element without restriction through the full flow element inlet conduit.

Smooth 90° elbow & aerospace turning vanes

In aerodynamic terms, a design which turns the air sharply through 90° is known as an inefficient corner. This typically has always been the method used to direct air into a compressed air filter element.

OIL-X EVOLUTION uses a smooth 90° elbow to direct air into the filter element, reducing turbulence and pressure losses significantly by turning the inefficient, sharp 90° corner into an efficient one.

As the diameter for the conduit increases, the benefits are reduced, therefore filter models 025 to 055 also include aerospace turning vanes which channels the air through a number of smaller, more efficient corners, reducing pressure loss and energy consumption even further.

Flow distributor

Filter models 015 to 055 include an upper flow distributor and all models include a lower conical flow diffuser.

The upper flow distributor provides turbulent free distribution of the air flow throughout the filter element ensuring full utilisation of all available filtration media, increasing filtration performance and reducing energy consumption.

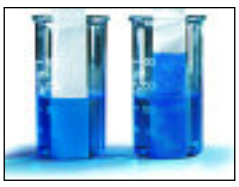
Conical flow diffuser

The combination of conical flow diffuser and a drainage layer wrapped under the lower endcap allows airflow through the lowest section of the element, which is not possible on conventional filters due to the position of the "wet band".

Deep bed pleating

Deep bed pleating of the filter media reduces the air flow velocity within the media, which in addition to improving the filtration performance of the element, significantly reduces pressure losses and energy consumption.

Specialist media treatment



OIL-X EVOLUTION uses a specialist treatment for it's filter media which actively repels oil and water, preventing the fibres of the media from soaking up liquid. This ensures coalesced liquids do not reduce the high voids volume of the filter media, therefore reducing system pressure losses and energy consumption.

ADVANCED FILTER HOUSINGS

OIL-X EVOLUTION FILTER HOUSINGS HAVE BEEN DESIGNED TO PROVIDE SIMPLE INSTALLATION, LONG HOUSING LIFE AND REDUCED MAINTENANCE TIMES. THE UNIQUE DESIGN OF THE OIL-X EVOLUTION FILTER PROVIDES MORE PORT SIZES FOR FLEXIBILITY AND ENSURES SERVICE TECHNICIANS DO NOT HAVE TO CONTACT CONTAMINATED ELEMENTS DURING MAINTENANCE.

No corrosion with Alocrom treatment.

Rapid corrosion of untreated aluminium.

Float drain

Filter connections
More port sizes are available to match both pipe size and system flow rate giving additional customer choice and reduced inistallation costs.

Compact and lightweight
Advanced element design provides a smaller, more compact filter.

Fully corrosion protected
All OIL-X EVOLUTION filters undergo cleaning, de-greasing and Alocrom treatment before painting. Alocrom treatment not only primes the aluminium surface for painting, it also provides corrosion protection. Additionally, all OIL-X EVOLUTION filter housings are also externally protected with a tough, durable dry powder epoxy coating.

OIL-X EVOLUTION filter housings are provided with a 10 year housing guarantee.

'Clean change' filter element
Element changes are now easy and do not require the user to touch the contaminated element during annual element change.

Minimal service clearance
Space saving design minimises service clearance and allows installation in confined spaces.

Choice of drains
Coalescing filters grade AO and AA are fitted as standard with energy efficient, zero air loss float drains for the removal of coalesced liquids. Dust removal filters grade AR and AAR and adsorption filters grade ACS are fitted with a manual drain.

Optional accessories
Additional mounting and interconnecting hardware is available, refer to Page 10 for more details.

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INTERNATIONAL APPROVALS

ASME VIII National Board

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AS1210

MAINTAINING AIR QUALITY AND ENERGY EFFICIENCY THROUGH REGULAR MAINTENANCE

IT HAS LONG BEEN THE PRACTICE TO CHANGE FILTER ELEMENTS BASED UPON THE PRESSURE DROP MEASURED ACROSS THE FILTER AS THIS IS DIRECTLY ATTRIBUTABLE TO OPERATIONAL COSTS. HOWEVER, ONE MUST REMEMBER THE REASON FOR INSTALLING THE FILTER IN THE FIRST PLACE, i.e. TO REMOVE CONTAMINATION.

FILTER ELEMENTS MUST ALWAYS BE REPLACED IN ACCORDANCE WITH THE MANUFACTURERS INSTRUCTIONS TO ENSURE THE DELIVERED AIR QUALITY IS NEVER COMPROMISED.

'Why should I change my filter element?'
To achieve the stringent air quality levels required by both modern industry and ISO 8573.1 : 2001 the international standard for compressed air quality, highly specialised filtration materials are employed, which has both a finite life and a finite capacity to retain contamination.

It is important to remember that when the filter life has expired, the required air quality can no longer be maintained.

Filters are installed to provide contaminant removal to a specific air quality requirement, therefore the primary reason to change filter elements should always be to maintain air quality.

Filter elements should be changed based upon manufacturers recommendations to maintain air quality.

"My filter is fitted with a differential pressure gauge and the needle is in the green - why should I change my element ?"

Many filter housings are fitted with "Differential Pressure Gauges". Generally, these are indicators not precise gauges and offer no level of calibration. Typically these will show an area of green and red, indicating if the needle is in the green, that the element does not require changing.

Differential pressure gauges are not filter service indicators or air quality indicators, they are simply measuring differential pressure and offer an indication of premature blockage.

As the filter media in an element degrades, even a tiny hole can result in the filter media rupturing, allowing all contamination to be carried past the filter into the system. If this should happen, the needle on the gauge would always indicate in the green area and the element would never be serviced until the user spotted contamination downstream. If the element was replaced after such an incident, contamination will still be present downstream of the filter for some time.

What are the consequences of not changing filter elements?
What seems like a cost saving in the short term can turn out to be a very costly mistake. Having identified a contamination problem in the compressed air system and the need for purification equipment, what would be the cost to your business of poor air quality?

- **Damaged adsorption dryer beds requiring unplanned desiccant changes**
- **Corrosion within the compressed air storage and distribution system**
- **Blocked / frozen valves and air motors**
- **Damaged machinery**
- **Contamination exhausting from valves and cylinders leading to unhealthy working environments, risk of personal injury, staff absences and personal injury claims**
- **Inefficient production processes**
- **Spoiled, damaged products**
- **Re-worked products**
- **Increased manufacturing costs**
- **Increased production downtime**

What are the benefits of regularly changing filter elements?

- **High quality compressed air - Guaranteed**
- **Protection of adsorption dryer beds**
- **Protection of downstream equipment, personnel and processes**
- **Reduced operational costs**
- **Increased productivity & profitability**
- **Continued peace of mind**

ISO 8573 – COMPRESSED AIR QUALITY STANDARDS

ISO 8573 IS THE GROUP OF INTERNATIONAL STANDARDS RELATING TO THE QUALITY OF COMPRESSED AIR AND CONSISTS OF NINE SEPARATE PARTS. PART 1 SPECIFIES THE QUALITY REQUIREMENTS OF THE COMPRESSED AIR AND PARTS 2 – 9 SPECIFY THE METHODS OF TESTING FOR A RANGE OF CONTAMINANTS.

ISO 8573.1 : 2001 is the primary document used from the ISO 8573 series and it is this document which allows the user to specify the air quality or purity required at key points in a compressed air system.

Within ISO 8573.1 : 2001 purity levels for the main contaminants are shown in separate tables, however for ease of use, this document combines all three into one easy to understand table.

Purity Class	Solid Particulate					Water		Oil
	Maximum number of particles per m^3			Particle Size	Concentration	Vapour	Liquid	Total oil (aerosol, liquid and vapour)
	0.1 - 0.5 micron	0.5 - 1 micron	1 - 5 micron	micron	mg/m^3	Pressure Dewpoint	g/m^3	mg/m^3
0	As specified by the equipment user or supplier					As specified by the equipment user or supplier		As specified by the equipment user or supplier
1	100	1	0	-	-	-70°C	-	0.01
2	100,000	1,000	10	-	-	-40°C	-	0.1
3	-	10,000	500	-	-	-20°C	-	1
4	-	-	1,000	-	-	+3°C	-	5
5	-	-	20,000	-	-	+7°C	-	-
6	-	-	-	5	5	+10°C	-	-
7	-	-	-	40	10	-	0.5	-
8	-	-	-	-	-	-	5	-
9	-	-	-	-	-	-	10	-

Specifying air purity in accordance with ISO 8573.1 : 2001

When specifying the purity of air required, the standard must always be referenced, followed by the purity class selected for each contaminant (a different purity class can be selected for each contaminant if required). An example of how to write an air quality specification is shown below :

ISO 8573.1 : 2001 Class 1.2.1
ISO8573.1 : 2001 refers to the standard document and its revision, the three digits refer to the purity classifications selected for solid particulate, water and total oil. Selecting an air purity class of 1.2.1 would specify the following air quality when operating at the standard's reference conditions :

Class 1 Particulate
In each cubic metre of compressed air, no more than 100 particles in the 0.1 - 0.5 micron size range are allowed
In each cubic metre of compressed air, no more than 1 particle in the 0.5 - 1 micron size range is allowed
In each cubic metre of compressed air, no particles in the 1 - 5 micron size range are allowed

Class 2 Water
A pressure dewpoint of -40°C or better is required and no liquid water is allowed.

Class 1 Oil
In each cubic metre of compressed air, not more than 0.01mg of oil is allowed. This is a combined level for both oil aerosol and oil vapour.

ISO 8573.1 : 2001 CLASS 0

THE ISO 8573.1 : 2001 TABLE ALSO INCLUDES A CLASS 0 FOR EACH TYPE OF CONTAMINANT. SHOULD AN APPLICATION REQUIRE COMPRESSED AIR PURITY WHICH IS HIGHER THAN THE LEVELS SHOWN FOR CLASS 1, THEN CLASS 0 ALLOWS THE USER AND AN EQUIPMENT MANUFACTURER OR SUPPLIER TO AGREE THEIR OWN LEVELS WITHIN THE FOLLOWING GUIDELINES

- THE PURITY LEVELS SELECTED MUST BE MORE STRINGENT THAN THOSE OF CLASS 1
- THE PURITY LEVELS SELECTED ARE MEASURABLE WITH THE TEST EQUIPMENT AND METHODS OF ISO 8573 PARTS 2 TO 9
- THE AGREED LEVELS ARE WRITTEN AS PART OF THE AIR QUALITY SPECIFICATION

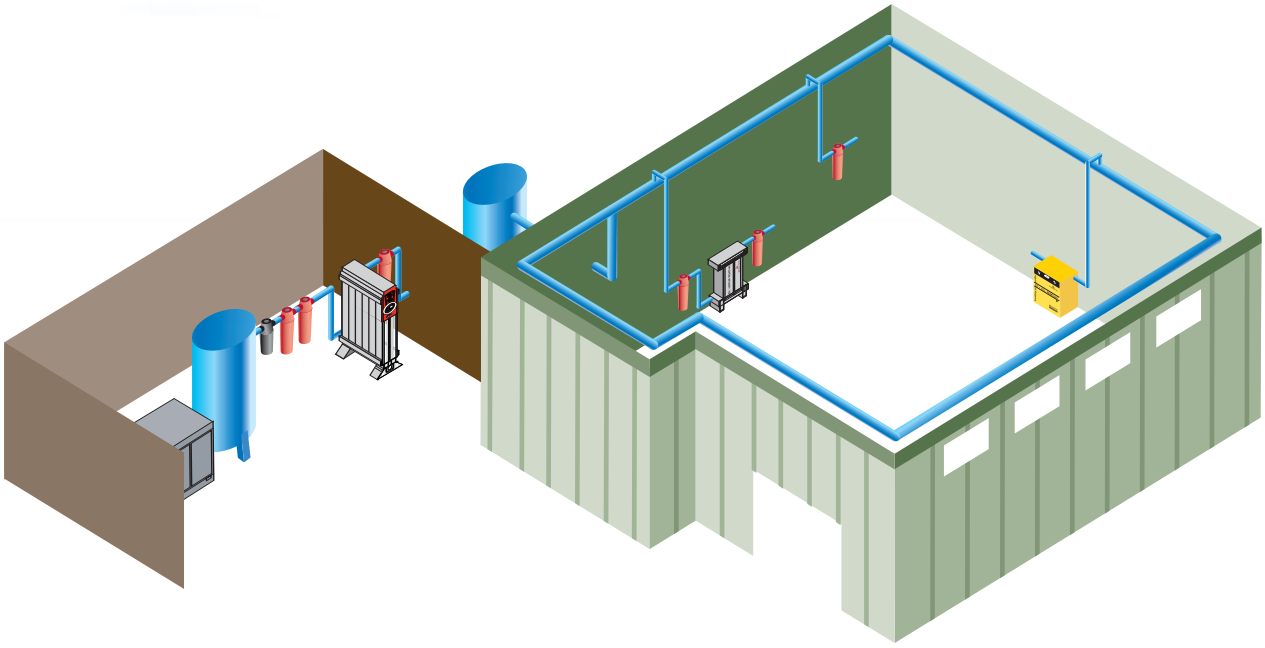
IMPORTANT NOTES

- CLASS 0 DOES NOT MEAN ZERO CONTAMINATION ALLOWED IN THE COMPRESSED AIR
- MANUFACTURERS SHOULD NOT STATE PRODUCTS COMPLY WITH CLASS 0 UNLESS PURITY LEVELS HAVE CLEARLY BEEN DEFINED AND AGREED WITH THE USER
- PURITY LEVELS BEYOND THE ACCURATE MEASUREMENT CAPABILITIES GIVEN IN ISO 8573 PARTS 2 TO 9 SHOULD NOT BE SELECTED AS THERE IS NO ACCURATE WAY OF VERIFYING PRODUCT PERFORMANCE
- TO OPERATE A COST EFFECTIVE COMPRESSED AIR SYSTEM, CLASS 0 SHOULD ONLY BE SPECIFIED AT THE POINT OF USE AND FOR THE MOST CRITICAL OF APPLICATIONS

OPTIMISED SYSTEM DESIGN FOR TYPICAL APPLICATIONS

THE QUALITY OF AIR REQUIRED THROUGHOUT A TYPICAL COMPRESSED AIR SYSTEM CAN VARY. THE EXTENSIVE RANGE OF PURIFICATION EQUIPMENT AVAILABLE FROM DOMNICK HUNTER ALLOWS THE USER TO SPECIFY THE QUALITY OF AIR FOR EVERY APPLICATION, FROM GENERAL PURPOSE RING MAIN PROTECTION, THROUGH TO CRITICAL CLEAN DRY AIR (CDA) POINT OF USE SYSTEMS.

DOMNICK HUNTER HAS COMPREHENSIVE RANGES OF PURIFICATION EQUIPMENT AVAILABLE TO EXACTLY MATCH SYSTEM REQUIREMENTS, ENSURING BOTH CAPITAL AND OPERATIONAL COSTS ARE KEPT TO A MINIMUM.



Cost effective system design

To achieve the stringent air quality levels required for today's modern production facilities, a careful approach to system design, commissioning and operation must be employed. Treatment at one point alone is not enough and it is highly recommended that the compressed air is treated prior to entry into the distribution system to a quality level suitable for protecting air receivers and distribution piping. Point of use purification should also be employed, with specific attention being focussed on the application and the level of air quality required. This approach to system design ensures that air is not "over treated" and provides the most cost effective solution to high quality compressed air.

The following table highlights the domnick hunter filtration and drying products required to achieve each air purity classification shown in ISO 8573.1 : 2001. If a Class 0 purity level is required, contact domnick hunter for recommendations regarding product requirements.

ISO 8573.1:2001	SOLID PARTICULATE		WATER	OIL
CLASS	WET PARTICULATE	DRY PARTICULATE	VAPOUR	TOTAL OIL (AEROSOL LIQUID and VAPOUR)
1	OIL-X EVOLUTION Grade AO + AA + TETPOR II	OIL-X EVOLUTION Grade AR + AAR + TETPOR II	PNEUDRI ADSORPTION DRYER -70°C PDP	OIL-X EVOLUTION Grade AO + AA + OVR OIL-X EVOLUTION Grade AO + AA +ACS OIL-X EVOLUTION Grade AO + AC
2	OIL-X EVOLUTION Grade AO + AA	OIL-X EVOLUTION Grade AR + AAR	PNEUDRI ADSORPTION DRYER -40°C PDP	OIL-X EVOLUTION Grade AO + AA
3	OIL-X EVOLUTION Grade AO	OIL-X EVOLUTION Grade AR	PNEUDRI ADSORPTION DRYER -20°C PDP	OIL-X EVOLUTION Grade AO
4	OIL-X EVOLUTION Grade AO	OIL-X EVOLUTION Grade AR	REFRIGERATION DRYER +3°C PDP	OIL-X EVOLUTION Grade AO
5	OIL-X EVOLUTION Grade AO	OIL-X EVOLUTION Grade AR	REFRIGERATION DRYER +7°C PDP	-
6	-	-	REFRIGERATION DRYER +10°C PDP	-

Filtration grades

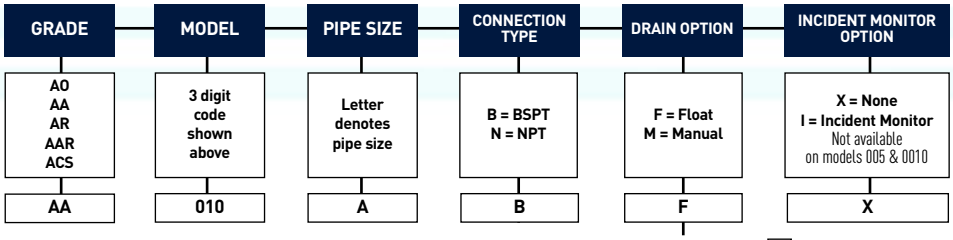
	WS	AO	AA	ACS	OVR	AR	AAR
Filter Type	Bulk Liquid Removal	Coalescing	Coalescing	Oil Vapour Removal	Oil Vapour Removal	Dry Particulate	Dry Particulate
Particle removal (inc water & oil aerosols)	N/A	Down to 1 micron	Down to 0.01 micron	N/A	N/A	Down to 1 micron	Down to 0.01 micron
Max Remaining Oil Content at 21°C (70°F)	N/A	0.6 mg/m³ 0.5 ppm(w)	0.01 mg/m³ 0.01 ppm(w)	0.003 mg/m³ 0.003 ppm(w)	0.003 mg/m³ 0.003 ppm(w)	N/A	N/A
Filtration Efficiency	>92%	99.925%	99.9999%	N/A	N/A	99.925%	99.9999%
Test Methods Used	ISO 8573.9	ISO 8573.2 ISO 8573.4 ISO 12500-1	ISO 8573.2 ISO 8573.4 ISO 12500-1	ISO 8573.5	ISO 8573.5	ISO 8573.4	ISO 8573.4
ISO 12500-1 Inlet Challenge Concentration	N/A	40mg/m³	10mg/m³	N/A	N/A	N/A	N/A
Initial dry differential pressure	N/A	<70 mbar (1.5psi)	<140 mbar (2psi)	<140 mbar (2psi)	350 mbar (5psi)	<70 mbar (1.5psi)	<140 mbar (2psi)
Initial saturated differential pressure	N/A	<140 mbar (2psi)	<200mbar (3psi)	N/A	N/A	N/A	N/A
Change Element Every	N/A	12 months	12 months	When oil vapour is detected	6000 Hrs	12 months	12 months
Precede with filtration grade	-	WS (for bulk liquid)	AO	AA	AA	-	AR

Product selection

Stated flows are for operation at 7 bar (g) (102 psi g) with reference to 20°C, 1 bar (a), 0% relative water vapour pressure. For flows at other pressures apply the correction factors shown.

Model	Pipe Size	L/s	m³/min	m³/hr	cfm	Replacement Element Kit	No.
grade 005A ☐☐X	¼"	6	0.4	22	13	010 grade	1
grade 005B ☐☐X	⅜"	6	0.4	22	13	010 grade	1
grade 005C ☐☐X	½"	6	0.4	22	13	010 grade	1
grade 010A ☐☐X	¼"	10	0.6	36	21	010 grade	1
grade 010B ☐☐X	⅜"	10	0.6	36	21	010 grade	1
grade 010C ☐☐X	½"	10	0.6	36	21	010 grade	1
grade 015B ☐☐☐	⅜"	20	1.2	72	42	015 grade	1
grade 015C ☐☐☐	½"	20	1.2	72	42	015 grade	1
grade 020C ☐☐☐	½"	30	1.8	108	64	020 grade	1
grade 020D ☐☐☐	¾"	30	1.8	108	64	020 grade	1
grade 020E ☐☐☐	1"	30	1.8	108	64	020 grade	1
grade 025D ☐☐☐	¾"	60	3.6	216	127	025 grade	1
grade 025E ☐☐☐	1"	60	3.6	216	127	025 grade	1
grade 030E ☐☐☐	1"	110	6.6	396	233	030 grade	1
grade 030F ☐☐☐	1¼"	110	6.6	396	233	030 grade	1
grade 030G ☐☐☐	1½"	110	6.6	396	233	030 grade	1
grade 035F ☐☐☐	1¼"	160	9.6	576	339	035 grade	1
grade 035G ☐☐☐	1½"	160	9.6	576	339	035 grade	1
grade 040G ☐☐☐	1½"	220	13.2	792	466	040 grade	1
grade 040H ☐☐☐	2"	220	13.2	792	466	040 grade	1
grade 045H ☐☐☐	2"	330	19.8	1188	699	045 grade	1
grade 050I ☐☐☐	2½"	430	25.9	1548	911	050 grade	1
grade 050J ☐☐☐	3"	430	25.9	1548	911	050 grade	1
grade 055I ☐☐☐	2½"	620	37.3	2232	1314	055 grade	1
grade 055J ☐☐☐	3"	620	37.3	2232	1314	055 grade	1

Filter coding example



Note: AO / AA grade filters for use up to 16 bar g (232 psi g) are supplied with a float drain [F] as standard. For pressures of 16 to 20 bar g (232 to 290 psi g) a manual drain [M] must be used. ACS / AR / AAR grade filters are supplied with a manual drain [M] as standard.

Correction factors

Line Pressure bar g	Line Pressure psi g	Correction Factor
1	15	0.38
2	29	0.53
3	44	0.65
4	58	0.76
5	73	0.85
6	87	0.93
7	100	1.00
8	116	1.07
9	131	1.13
10	145	1.19
11	160	1.25
12	174	1.31
13	189	1.36
14	203	1.41
15	218	1.46
16	232	1.51
When ordering an AO/AA filter for pressures above 16 bar g (232 psi g), use manual drain. Replace F with M in product code. e.g. 015BBFX now 15BBMX		
17	247	1.56
18	261	1.60
19	275	1.65
20	290	1.70

To find the Correction factor for 8.5 bar g (122psi g) =

$$\sqrt{\frac{\text{System Operating Pressure}}{\text{Nominal pressure}}}$$

$$= \sqrt{\frac{8.5 \text{ bar g}}{7 \text{ bar g}}} = 1.10$$

Filter selection example

Selecting a filter model to match a system flow rate and pressure.

Example: System flow 1050 m³/hr at a pressure of 8.5 bar g

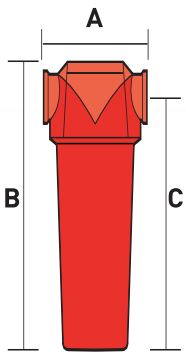
1. Obtain pressure correction factor from table or calculate factor using method shown. Correction factor for 8.5 bar g = 1.10
2. Divide system flow by correction factor to give equivalent flow rate at 7 bar g 1050m³/hr ÷ 1.10 = 955 m³/hr (at 7 bar g)
3. Select a filter model from the above table with a flow rate above or equal to 955 m³/hr. Filter model selected : 045
4. Select filtration grade General purpose filter required, grade AO selected : Model AO045
5. Select pipe connection & Thread type System uses 2" piping and BSP threads : Model AO045HB
6. Select drain type and other options. Automatic float drain required, differential pressure monitor not required. Model AO045HBFX Final Filter Model Selected - AO045HBFX

Technical data

Filter Grade	Filter Models	Max Operating Pressure		Max Recommended Operating Temp		Min Recommended Operating Temp	
		bar g	psi g				
AO	005 ☐☐ F ☐ - 055 ☐☐ F ☐	16	232	80°C	176°F	1.5°C	35°F
AO	005 ☐☐ M ☐ - 055 ☐☐ M ☐	20	290	100°C	212°F	1.5°C	35°F
AA	005 ☐☐ F ☐ - 055 ☐☐ F ☐	16	232	80°C	176°F	1.5°C	35°F
AA	005 ☐☐ M ☐ - 055 ☐☐ M ☐	20	290	100°C	212°F	1.5°C	35°F
AR	005 ☐☐ M ☐ - 055 ☐☐ M ☐	20	290	100°C	212°F	1.5°C	35°F
AAR	005 ☐☐ M ☐ - 055 ☐☐ M ☐	20	290	100°C	212°F	1.5°C	35°F
ACS	005 ☐☐ M ☐ - 055 ☐☐ M ☐	20	290	50°C	122°F	1.5°C	35°F

Weights and dimensions

Model	Pipe Size	A		B		C		Weight	
		mm	ins	mm	ins	mm	ins	kg	lbs
005A	¼"	76	3.0	154.5	6.1	126.5	5.0	0.5	1.1
005B	¼"	76	3.0	154.5	6.1	126.5	5.0	0.5	1.1
005C	¼"	76	3.0	154.5	6.1	126.5	5.0	0.5	1.1
010A	¼"	76	3.0	181.5	7.2	153	6.0	0.4	0.88
010B	⅜"	76	3.0	181.5	7.2	153	6.0	0.4	0.88
010C	½"	76	3.0	181.5	7.2	153	6.0	0.4	0.88
015B	⅜"	97.5	3.8	235	9.3	201	7.9	1	2.2
015C	½"	97.5	3.8	235	9.3	201	7.9	1	2.2
020C	½"	97.5	3.8	235	9.3	201	7.9	1	2.2
020D	¾"	97.5	3.8	235	9.3	201	7.9	1	2.2
020E	1"	97.5	3.8	235	9.3	201	7.9	1	2.2
025D	¾"	129	5.1	275	10.8	232.5	9.2	2.2	4.84
025E	1"	129	5.1	275	10.8	232.5	9.2	2.2	4.84
030E	1"	129	5.1	364.5	14.3	322	12.7	2.6	5.72
030F	1¼"	129	5.1	364.5	14.3	322	12.7	2.6	5.72
030G	1½"	129	5.1	364.5	14.3	322	12.7	2.6	5.72
035F	1¼"	170	6.7	432.5	17.0	382.5	15.1	4.5	9.9
035G	1½"	170	6.7	432.5	17.0	382.5	15.1	4.5	9.9
040G	1½"	170	6.7	524.5	20.6	474.5	18.7	5.25	11.55
040H	2"	170	6.7	524.5	20.6	474.5	18.7	5.25	11.55
045H	2"	170	6.7	524.5	20.6	474.5	18.7	5.25	11.55
050I	2½"	205	8.1	641.5	25.3	581.5	22.9	10	22
050J	3"	205	8.1	641.5	25.3	581.5	22.9	10	22
055I	2½"	205	8.1	832	32.8	772	30.4	12	26.4
055J	3"	205	8.1	832	32.8	772	30.4	12	26.4



Optional accessories

Incident Monitor
Used to indicate premature high differential pressure. Indicator can be retrofitted to existing housings without depressurising the system.

Incident Monitor

Filter Model	
015 - 055	DPM

FXKE Fixing Clamp
Fixing clamp allows quick and simple connection of multiple filter housings.

Filter Fixing Kits

Filter Model	
005 - 010	FXKE1
015 - 020	FXKE2
025 - 030	FXKE3
035 - 045	FXKE4
050 - 055	FXKE5

MBKE Mounting Brackets
Mounting brackets provide additional support to filters installed in flexible piping systems or OEM equipment.

MBKE Mounting Bracket Kits

Filter Model	
005 - 010	MBKE1
015 - 020	MBKE2
025 - 030	MBKE3
035 - 045	MBKE4
050 - 055	MBKE5

Publication Reference: 4402 09/07 Rev. 008
Stock No. 17 400 4402

filtration purification separation

bcas BRITISH COMPRESSED AIR SOCIETY LIMITED LRQ4003083 LRQ4001479

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